From: Christine Schonewald <chris@schonewald.net>
To: <docket@energy.state.ca.us>
Date: 10/14/2005 3:24:23 PM
Subject: Docket no. 04 IEP 1K Committee Draft Document Hearings

I have three (3) - WORD files that accompany this email.

1-The first is my personal professional response to the Draft Report that iterates my comments presented at the hearings last week. I told the Commission I would be presenting those comments in writing.

2-A copy of technical review of publication #500-04-052 requested of me by PIER on behalf of the Commission

3-My resume showing qualifications for making my comments

Thank you.

CHRISTINE SCHONEWALD, PhD • Ecological Advising
Applications to Public and Private Lands Management

October 14, 2005

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

REGARDING: Docket 04 IEP IK Committee Draft Document Hearings

Honorable Chair and Commissioners

This letter is a personal professional response to the *Committee Draft Report* of the 2005 Integrated Energy Policy Report. It adds to my presentation to the Commission at the Hearings on October 5, 2005 in Sacramento. It also adds to my detailed scientific review that PIER offices requested regarding publication #500-04-052: (PIER final Project Report) *Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area*.

PIER asked me to review publication #500-04-052 based on my thirty years practical and academic experience regarding policy development, agency administration and research. My specialties include development of methods for information transfer between science and "applications" specifically concerning Public Lands policy and management.

Based on my review of the report I ask that page 102 of the report be modified to exclude criticizing references made to *Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area*. If the two attachments are insufficient, please contact me for questions.

My comments are constructive.

Paragraph 1 Specifically Exclude:

. "The 2004 *Energy Report Update* also recommended using findings from the Energy Commission's avian mortality studies to evaluate permits for new and repowered wind turbine facilities. ~~Since publication of that report, an extremely polarized debate has emerged between the wind industry, the Energy Commission staff and consultants, and environmentalists who believe there have been inadequate efforts to reduce the number of birds killed by wind turbines in the Altamont Pass Wind Resource Area. A focal point of that debate has been the statistical reliability of the research cited in the 2004 Energy Report Update and the subsequent use of that research by Energy Commission staff and consultants.~~

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Paragraph 1 Summary Comment:

Designs of studies conducted in controlled environments (such as laboratory, structural engineering, and hypothetical modeling) differ significantly from studies conducted in uncontrolled field environments. Even field studies designed for theory-oriented (non-applied) hypothesis testing have fundamental differences in design and statistical analysis from applications-oriented field studies. While theory-oriented study design makes controlled assumptions regarding climate, landscape and wildlife, the applied field studies cannot control "environment". There are solid ways of dealing with this obstacle. The avian studies publication #500-04-052, to which the Committee Draft Report refers, successfully avoided making improper assumptions associated with an idealized design.

Land ownership, wind turbine maintenance and species specific variability of animal behavior are properly accounted for in publication #500-04-05 study design and analysis. What were labeled as improper assumptions and statistical considerations, reflect the fact that the responses came from professionals not experienced with ecological resources management and impact analysis. Such a misunderstanding of professionally-specific research technique inevitably causes damage, possibly irreversible. This damage threatens publication #500-04-052 contractors, the PIER program and inevitably the Commission.

Paragraph 2. (line 3) Specifically Exclude:

The Energy Commission believes that the earlier research, Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area, ~~represents an important initial effort to craft a methodology to prescribe mitigation measures, but that it should not be misused to form the sole basis for such mitigation measures. Inadequate access to certain turbines, time lapses between surveys, length of survey period, and various extrapolation techniques deprive it of the evidentiary value which the Energy Commission would require as the basis for mitigation measures in a power plant sit[t]ing place. The scientific value of ongoing Energy Commission research into avian mortality prevention should not be jeopardized by misapplication of what are essentially experimental results.~~

Paragraph 2. (line 3) Summary Comment:

"Developing Methods…" is an important initial effort to advance mitigation of avian mortality and comply with federal and state laws. Moreover the product of the research provides a solid platform upon which to base new investigations on alternative methods of mitigation, while still utilizing the advanced alternative wind energy technology. State and Federal and Private industry Cooperation and the prevention "avian mortality prevention" will be facilitated by publication #500-04-052 if the report is interpreted and applied properly. Note that "Evidentiary value" is threatened by this misinterpretation of the defendable contributions of PIER publication #500-04-052.

Added Constructive Comments:

The launching of a new aspect of investigation by PIER is needed to compliment previous studies of how "context" influences mortality. This compliments the identification of "contextual causes" that was requested of the contractors in publication #500-04-052. Their product offers a departure for determining species' innate capacities to respond in different environmental contexts presented by different wind turbine landscapes, in different arrangements and for different seasons. Some animal behavior, such as responses to physical objects, light, sound… are genetically triggered and programmed. They not subject to learning influences. By identifying the known innate avian responses to physical sensations, we can apply this information to some specific field tests and determine how wind turbine landscape contexts interact with species' innate contextual responses. This makes it possible to identify how to decrease avian mortality. This progress could not be possible without publication#500-04-052.

There are several ranges of technical expertise that have not entered into the applied realm of alternate energy modified landscapes—not only California. The first expertise is the classical application of "Ethology", specifically the knowledge about innate sensory response by wildlife to physical sensations. Using their most recent project results, the PIER program now has the necessary information to move forward. P*ublication #500-04-052* is a *source*, not *jeopardy*, for making demonstrable progress.

Once the two paragraphs on page 102 are dropped or reworded, with the suggestions above considered, the final Integrated Energy Policy Report will construct and denote progress. Such improvement is sound.

Respectfully,

Christine Schonewald

Christine Schonewald, Ph.D.[1]

[1] Please be aware, that all of my publications, appointments, etc. during the last 35 years have been recognized under the name Christine Schonewald. However my *signature* on this and all legal and personal documents is that of my married name, "Christine Green."

CHRISTINE SCHONEWALD, PhD • Ecological Advising

October 14, 2005

Dr. Edward Vine
Research Coordinator
California Institute for Energy and Environment
University of California, Office of the President
c/o Lawrence Berkeley National Laboratory
Building 90-4000
Berkeley, CA 94720-8136

Dear Dr. Vine

This is in response to your request for a review of Publication #500-04-052: (PIER Final Project Report) Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area.

I have read the Executive Summary, Abstract and Chapters 1,2,3,7 and 8, the Subcontractor Report NREL/SR-500-27545 May 2000, Discussion Topics and Points: Carl G. Thelander, BioResource Consultants (September 21, 2005) as well as a few other materials. It was impossible to read the entire package enclosed with the Memorandum from California Energy Commission Melinda Dorin and Linda Spiegel to Commissioner Geesman and Commissioner Boyd, Dated August 31, 2005. I spent some time familiarizing myself with the objectives and challenges that your office and the California Energy Commission face regarding the development of Wind-energy. Needless to say it is overwhelming—though unexpectedly, I've found making the necessary turbines work in a context that will at best be optimized, a fascinating challenge that I would like to discuss with you and your associates. I'll return to this later, after my review.

The expansion of wind energy research throughout the world appears to provide knowledge regarding the physics and engineering components of the Wind Resource generation. Most of what I've seen so far comes from Germany, U.S., and Denmark. From what I see regarding wildlife-oriented studies these provide mostly standard disciplinary perspectives from population ecology, wildlife biology and landscape ecology, and some specialized work concerning animal behavior (migratory, hunting, foraging, feeding, roosting, predator avoidance and burrowing). It is evident that the challenge of safely integrating wind turbines into open

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landscapes is a big one, but something we cannot avoid. The achievements of the California Energy Commission's Public Interest Energy Research Program and the BioResources Consultants are truly impressive.

You have already received my Resume, and I would summarize that my background that is relevant to this review includes the following. Training/research and expertise in animal behavior and ethology, ecology, small population conservation biology, landscape ecology, wildlife management, systematics, landscape management (specializing in protected and managed federal and state lands) as well as practical experience in Federal lands management, legislation and program administration. These are in addition to teaching and other advisory and consulting experience.

1. "Were the technical approaches used in the research appropriate for achieving stated goals?"

Yes.

The contractors were asked to assess the causes and predictability of fatalities for avian species in the vicinity of the wind turbines. Their approaches are appropriate for those goals. Although, as the contractors indicated in their study, preexisting regional constraints within APWRA would restrict what the contractors could include in their design. Recognizant of these factors the consultants stated that they would compensate for preexisting regional constraints on design by maximizing the frequency of their observations, by testing the accuracy of data as well as of prior studies before using any temporal and spatial extrapolations, necessary for developing their fatality association models.

The contractors' technical approaches were suitable to the conditions at APWRA.

2. "Are the methods and assumptions clearly stated?"

Yes.

The contractors provided clear details, repeatedly, of how they could best determine the structural and landscape associations with observed bird fatalities. Realizing some of the preexisting APWRA constraints on study goals and design, the contractors explained how the distribution and conditions of bird fatalities could best be measured. The study sampling designs, criteria determinants for carcass identification, dating of fatalities, assumptions regarding slopes, edge determinations were all clear. The contractors were careful in relating what assumptions they made for evaluating the significance of fatality associations. They were clear in relating why they used conservative approaches to suggesting potential applications of their models and recommendations.

3. "Is the study design scientifically sound?"

Yes.

The contractors identified sampling sites and recorded fatalities, they developed association models and recognized why they could not directly determine mortality trends, making that clear. In so doing they were able to construct data recording methods and analysis

that would maximize the utility of obtainable data and best collect information required by the CEC in evaluating requirements set by Federal and State laws as well as CEC institutional mandates and responsibilities. They made special effort while developing their models to maximize data compatibility across studies and maximize the models' benefits for future applications.

The contractors factored into their design, the limitations set by preexisting constraints in APWRA on defining contract goals, study design, selection of statistical tests and model construction. The constraints they list are major considerations for any project design:

- Difficulty of obtaining controlled access to field sites and resulting limitations on the timing and consistency of access to multiple study sites,

- Temporal and spatial overlapping of active and independently managed fatality mitigation efforts, including pest control programs, turbine and tower wildlife-related modifications and, I believe, periodicity in activity periods for turbines,

- APWRA boundary delimitations that affect the kinds of bird population data that could be collected.

The contractors dealt with these preexisting limitations on experimental design by making an important statistical assumption. They stated that relationships between the wind turbines (and associated landscape features) and the observed bird fatalities are random, and then tested that assumption. By using simple associative observed/expected models the contractors marked when fatalities were predictably associated with equipment or landscape and when conditions were surprisingly non-problematic. Fortunately, this could be accomplished without making unnecessary inferences about mortality rates and by using data collected from different time periods as well as from different wind turbine fields/strings. What inferences and extrapolations were made are carefully designed and clearly described.

The contractors make it clear that the project would record deaths (fatality) and would record what landscape and structural features are associated with fatalities. Recognizing the impossibility of using multiple spatial scales (constraints list above) the contractors did not draw conclusions from this project's data set on (1) local bird population trends and (2) on how severely the turbines are affecting those bird population trends. Therefore the outcomes of the project are limited more by parameters imposed on the project than by the methods used by the contractors.

Based on how legislations predetermine the need for their project, the contractors categorized their bird species and data collection methods. The Endangered Species Act, Migratory Bird Act, Bald Golden Eagle Protection Act, and California Fish and Game Code 3503.5 all affected the goals and methods of categorization for species.

The contractors took special care to plan and define observations to make them compatible for comparison with earlier data sets, collected at the same sites. For example there is

the 1988/2002 study from which fatality data had been excluded from use because that data set represented less than the required 12 months for analysis. However, the contractors made the data recording methods sufficiently similar in the current project to allow the earlier project's data to be incorporated into the new data set. And, because of how they structured their comparisons, the duration of the time gap does not enter into the evaluation of association-fatalities. They discussed the importance of cautious data adjustments/transformations to permit cross-project comparisons. This was carefully done and done well.

The investigators make an in depth review of different sources of error that could affect data interpretations (scavenger carcass removals, observation errors, wind, rolling, …) Their uses of literature, regarding scavenger removal rates as well as other sources of error, provided some interesting and unexpected results—such as scavenger removal rates. I found this well thought out and applied.

In discussing their carcass removal rate estimates, the investigators went to great lengths to justify how far back in time, the fatalities could be estimated to have occurred.

The investigators provide detailed descriptions for their calculations of "window" spaces, "swept" rates and other factors. Their description of uses of R^2 for use in prediction, and uses of r_p for correlation make sense. It was correct and particularly important that the contractors explain why they did not use ANOVA tests. I agree that due to difficulties with replications and controls they needed another way of testing relationships. As with other parts of the study one is constantly reminded of the preexisting temporal and spatial complications at APWRA, concerning "study site" access—a number of conventional analyses such as ANOVA could have been used but would have definitely been inappropriate and flawed the project results.

4. "Were appropriate protocols used?"

Yes.

In terms of satisfactory study design, the consultants did follow their procedures as they had designed them. When they ran into stumbling blocks, such as inability to obtain access to a site, they did not stop but made note and continued their work, making suitable adjustments, already incorporated in the project's design.

In terms of taking the necessary steps between investigators and institutions to provide for the collection, analysis and exchange of data, it seems that the investigators did go out of their ways to remain in contact and follow the advises given from PIER. I have had too little time to read all comments on interactions between the consultants and wind turbine companies and public agencies, but the "Integrated Energy Policy Report (IEPR) Background", "California Energy Commission Melinda Dorin and Linda Spiegel Memorandum", "Discussion Topics and Points" all suggest that the contractors were particularly attentive to requirements, recognizant of their reliance on cooperation and careful information exchange with the CEC and PIER, Private Companies and Alameda.

5. “Are the conclusions supported?”

Yes.

The CEC has worked hard to help California generate alternative energy, specifically at the APWRA. The products of the contractors are likely to remain useable over time, because of how carefully the analysis was conducted and models developed to be usable at different times and in different places. Their study design and analyses are solid and conservative.

6. “Other Observations and Comments”

Rodent Control

Some sites where fatalities seemed abundant were also sites with increased rodent control and the investigators are correct to suggest that rodent controls were possibly affecting survival deleteriously. The problem remains that for any future projects—the ability to resolve any arguments regarding those effects, whether positive or negative, will require fewer constraints on access to turbine sites. They will definitely require increased cooperation between rodent management and PIER research projects.

Classifications of Landscape and Wind Turbine Structural Characteristics

I found that the detailed list of factors for consideration for fatality associations (34 of them) was quite detailed. The tests of observed versus expected results are mechanical and methodical.[1]

Ecological “Sinks”

I think it is very important to take into account that to evaluate the overall importance of wind turbines on wildlife (the study of mortality trends), the site over which the wildlife are counted and monitored should include more area than APWRA. The wind turbine landscape is potentially an ecological sink. To identify whether it (the collection of turbines) is acting as a sink on wildlife populations requires the description of a larger area within which the mortality trends could be compared across a grid, comprised of several different sites. Then the fatalities recorded at turbines could be interpreted in contexts of regional population dynamics and not just links between fatalities and specific turbine and landscape characteristics.

[1] I do have comments regarding the classifications/groupings of species as well as of landscape variables in future PIER projects and CEC considerations. These are in a separate letter, since they do not have to do with this project’s evaluation.

Population Mortality and Densities

In one of his studies, Dr. Smallwood revealed that uses of population behavior and ecological studies of mammals (Carnivores, specifically) relied on study designs that predetermined a population's distribution and that this created a spatial bias that severely affects the interpreted population abundances and densities. He defined the limitations on data collected in the said studies and made it possible to "correct" for the bias and provide better estimates for population densities than were previously available. Thus, he made data from those previous studies useful, rather than leave them as they were, namely deceptive or inaccurate.

In this AWPRA the contractors recognize this problem of study design and inference, specifically with respect to population dynamics. The sampling of data to determine the effects of a potential impact (turbines) within a restricted area (AWPRA) cannot provide valid data regarding the effects of turbines on population dynamics without proper sampling designs and project site delimitations. Multiple scales of observations are necessary. Recognizing these problems, the contractors did particularly well.

Mirrored Landscapes

Dr. Smallwood has spent most of his time during the last several decades monitoring raptors and terrestrial vertebrates in the central valley and foothills of California. Included in this are countless observations of the shifts in fauna that have taken place with different types of landscape change, particularly roads and agricultural rodent control programs. Regarding roads: In the valley as urbanization spreads surrounding Sacramento, Dr. Smallwood has observed the declines in terrestrial predator populations while seeing increases in avian predator populations. With different agricultural and road development programs, he's observed shifts in abundances of different burrowing rodents and predatory birds.

Using his previous work, I would propose that the landscape of the APWRA may be undergoing one of those faunal shifts, manifesting a *mirror image* of the agricultural fields—the ground is unobstructed, but the air has fatal corridors, as if it were a transected surface. This makes sense since different bird species tent to favor specific elevations. While this may not be a new concept, it is important to consider that the mirrored image, it may be the terrestrial predators that have advantage and face fewer daily threats. The manner in which those dynamics affect predatory birds and terrestrial species (birds and mammals) is something for which Dr. Smallwood may provide an enlightening perception.

Following this letter I am sending a second one, probably tomorrow. The contextual subject matter of that letter does overlap with Publication #500-04-052, only in terms of wildlife interactions with landscape. That letter will not in any way reflect upon or modify my positive evaluation of this PIER project completed by BioResource Consultants. It is only that this review process caused me to ask additional questions regarding landscape planning in the context of both human and wildlife interactions with modified landscapes containing major structures, such as wind turbines.

I appreciate the opportunity to be of help, and hope that my comments regarding Publication #500-04-052 are useful—despite the time constraints and the volume of material to be reviewed.

Respectfully,

Christine Schonewald, Ph.D.[2]

[2] Please be aware, that all of my publications, appointments, etc. during the last 35 years have been recognized under the name Christine Schonewald. However my *signature* on this and all legal and personal documents is that of my married name, "Christine Green."

Christine Schonewald, Ph.D.

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RESUME

PROFESSIONAL ORIENTATION

Present: Ecological Advisor. Prior: (1) Development of US and international programs and research for the application of Science to the design and management professions in design and management of parks, forests, wildlife refuges and other conservation projects. (2) Teaching University, graduate and undergraduate levels (3) Multidisciplinary Research: Conservation biology, animal behavior, elk taxonomy, reserve design, wildlife management, information transfer, carnivore census ecology, reserve design, and boundary interpretations.

PROFESSIONAL CONSULTING/ADVICE (ALPHABETICAL)

Academic Association for the Advancement of Science * Boone & Crocket Club * Canadian National and Provincial Parks * Conservation Biology Society * De Soto National Wildlife Refuge, Iowa * Federal World Bank * Indian Institute of Science, Bangalore, India * International Union for the Conservation of Nature and Natural Resources (IUCN) * Smithsonian Museum of Natural History * South Korean Biological Diversity Council, Sòul, Korea * States: Arizona, California, Florida, Hawaii, Pennsylvania, West Virginia, Texas * US Agency for International Development, Washington, D.C. * US Congressional Information Service * US Department of the Interior, including the National Park Service, Fish and Wildlife Service, and Bureau of Land Management * US and international offices of the International Man and the Biosphere Program, UNESCO * US Environmental Protection Agency * US National Emergency Response Team (Ixtoc Oil Spill) * US National Forest Service * World Resources Institute

PROFESSIONAL POSITIONS

Present: Self-employed: writing children's books and photographic restoration/arts, occasional consulting conservation-related.
Year 2000 and Prior: Research Scientist US National Park Service, US Biological Survey, US Geological Survey (22 years); Prior: Assistant Professor George Mason University, VA; Contract, National Institutes of Health, Interagency Primate Steering Committee; Lecturer Northern Virginia Community College; Subcontract, Federal Marine Mammal Commission, Washington, D.C.

HONORARY POSITIONS

Adjunct Faculty, Institute of Ecology--Ecology Graduate Group, Geography Graduate Group and Division of Policy and Environmental Sciences, University of California, Davis, California (3 Post Doctoral Associates, >13 Doctoral Students and teaching 1-2 seminar courses per year); Adjunct faculty, Montana State University, Bozeman MT. Technical journal editor (North, Central and South America) Biological Conservation, UK (9 years); Member, Program on Protected Areas, The World Conservation Union (IUCN); Member, Committee on Biodiversity, National Research Council, Commission on Life Science, Washington, D.C.; President, George Wright Society; Member, Scientific Advisory Board: Department of Environmental Horticulture, University of California, Davis, CA; Scientific Advisor, California Wilderness Coalition; Editorial board, Ecological Abstracts, Elsevier, Ltd. UK Active with the UNESCO Man and the Biosphere Program, first in Washington, D.C. and in the 1990's with the Golden Gate Biosphere

Reserve. For several years—North, Central and South American editor for the international journal, Biological Conservation.

ACADEMIC BACKGROUND

1977 Ph.D. and MS: University of Maryland, College Park, MD. Biology: animal behavior, Mammology, ecology. Dissertation Courtship Behavior in *Myoprocta pratti* (the acouchi, a caviomorph rodent) & graduate fellow National Zoological Park/Smithsonian Institution; 1972 BA University of California, Davis, CA. Zoology-invertebrate biology and animal behavior 1978.

SELECTED ACCOMPLISHMENTS

Led one the first efforts for information transfer of genetics and demography to wildlife, vegetation and captive population management resulting in Genetics and Conservation (1983, republished 2003 and considered a classic in what is now a discipline, Conservation Biology).

Developed the first on site training for vegetation restoration for the US National Park Service; member of core team developed the first model National Oil Spill-model Recovery Plan. Began the first training program on the curation of natural history collections for the National Park Service and wrote the associated modifications of the Federal Code.

INVITED LECTURES AND SEMINARS (PARTIAL LIST ATTACHED)

Approaching 50 invited, not including classes taught

PUBLICATIONS (JOURNALS, BOOKS) (LIST ATTACHED)

Close to 50 publications, including book, several invited publications and additional major reports

FOREIGN LANGUAGE

French-conversant

PRESENT VOLUNTEER WORK

El Dorado County Mentorship program Malcolm Junior High School; Medical Research Project Review Institutional Animal Care; Intermittent- El Dorado County Library-English Language Training Program.

ATTACHMENT #1. SELECTION OF LECTURES

Academic Association for the Advancement of Science * Academy of Science and Literature, Mainz, Federal Democratic Republic of Germany * Bureau of Land Management, Tucson, AZ * California State University, San Francisco CA * Convent of the Sacred Heart High School * Glacier National Park * Golden Gate National Recreation Area, San Francisco CA * IAI AMIGO, NSF-funded Chile workshop * MAB: Central Coastal Biosphere Reserve, SF, CA * Mid-Peninsula Regional Open Space District and the Rivers and Trails Conservation Assistance Program of the National Park Service, Sacramento, CA * Montana State University, Bozeman, Montana * Natural Areas Association A; Rochester, NY * Parks Canada, Ontario, Canada * Pennsylvania Academy of Sciences * Rutgers University, Princeton, New Jersey * San Francisco CA * San Jose State University, San Jose CA * Sierra Club, Sacramento, CA * Society of American Foresters Wilderness Working Group, Sacramento, CA * South Korea Biodiversity Council, Sòul, Korea * U.S. Department of Agriculture/USDI/NGO Conference, Portland, OR * U.S. Forest Service, Corvallis, Oregon * U.S. National Park Service Denver Service Center, Denver, Colorado * U.S. National Park Service, Harper's Ferry Training Center, W. Virginia * U.S. National Park Service, Regional Task force on Interpretation of Biodiversity * U.S. National Park Service, Washington, D.C. * U.S. National Park Women's Organization, National Park Service, Washington, D.C. * U.S./U.S.S.R. cooperative research, Oak Ridge National Laboratories, Gatlinburg, Tennessee * University of British Columbia, Vancouver, Canada * University of California Extension Service for Resources Management Training Davis, CA * University of California, Berkeley CA * University of California, Davis CA, Law School, School of Veterinary Medicine, Environmental Studies and Institute of Ecology * University of Florida, Gainesville FL * University of Washington * Wildlife Society, Pennsylvania *

ATTACHMENT #2: PUBLICATIONS (JOURNALS, BOOKS, ETC.)

2003--a 20 year reprinting by Blackburn Press, N.J.: *1983 Schonewald, C., S. Chambers, B. MacBryde, and L. Thomas. Genetics and Conservation: A Reference for Managing Wild Animal and Plant Populations. previously Benjamin Cummings Publ. Co., Menlo Park, CA, 722pp.*

2002 Grigione, M. M., P. Beier, R. A. Hopkins, D. Neal, W. D. Padly, C. M. Schonewald, and M. L. Johnson. Ecological and allometric determinants of home-range size for mountain lions (Puma concolor). Animal Conservation 5:317-324

2001 Schonewald, Christine. Introduction to Boundary Space. Complexity 6(2):41-57.

1999 Sauvajot, Raymond M., Marybeth Buechner, Denise A. Kamradt and Christine Schonewald. Patterns of human disturbance and response by small mammal and birds in chaparral near urban development. Urban Ecosystems.

1998 Smallwood, K. Shawn and Christine Schonewald. Study design and interpretation for population estimates of mammalian carnivores. Oecologia 113: 474-491.

1997 Reynolds, John and Christine Schonewald. U.S. National Parks in landscape contexts; roles for science in the coming century. George Wright Forum 14(3):5-11.

1996 Smallwood, K. Shawn, Geoff Jones, and C. Schonewald. Spatial scaling of allometry among terrestrial, mammalian carnivores. Oecologia 107:588-594.

1996 Smallwood, K. Shawn and Christine Schonewald-Cox. Scaling population density and spatial pattern for terrestrial mammalian carnivores. Oecologia 105:329-35.

1995 Schonewald, Christine. Studying protected areas in North America and Hawaii; a research biography. Landscape Architecture. December. S. Korea.

1994 Schonewald, Christine. Cranial variation in North American wapiti, *Cervus elaphus*, sexes and subspecies, with intra- and intercontinental comparisons. Acta Theriologica 39(4):431-452.

1994 Myers, R. L. and Christine Schonewald-Cox. Conservation biologists conduct study of alien species on Hawaiian rainforests. Park Service; A Resources Management Bulletin. National Park Service, US Department of the Interior 14 (3).

1994 Schonewald-Cox, Christine. 1994. Protection of biological diversity: Missing connection between science and management. pp. 171-183. In Biological Diversity: Problems and Challenges. S. K. Majumdar, F. J. Brenner, J. E. Lovich, J. F. Schalles and E. W. Miller (eds.), Pennsylvania Academy of Sciences Press.

1993 Davis, Brian N. K., Tim R. New and Christine Schonewald-Cox. Editorial. Biological Conservation 64(1):1.

1993 Veirs, S., T. J. Stolghren, and C. Schonewald-Cox (eds.) Proceedings of the Fourth Biennial Conference on Research in California's National Parks, Sept 10-12, 1991 Sequoia and Kings Canyon National Parks.

1992 Schonewald-Cox, Christine. Invited book review of *Nature Reserves: Island Theory and Conservation Practice*, Craig L. Shafer, Smithsonian Institution Press, Washington, DC, 1990. "Little islands floating in seas of indifference?" 268p. Biological Conservation 63 (1): 95.

1992 Buechner, M., C. Schonewald-Cox, R. Sauvajot, and B. Wilcox. Cross-boundary issues for National Parks: What works "on the ground." Environmental Management 16 (6): 799-809.

1991 Schonewald-Cox, C. and M. Buechner. Park protection and public roads. pp. 373-395 *In* P. L. Fiedler and S. Jain (eds.), Conservation Biology: The Theory and Practice of Nature Conservation, Preservation and Management. New York: Chapman and Hall, 507p.

1991 Schonewald-Cox, C., R. Azari, and S. Blume. Mammalian carnivore censuses and densities. Conservation Biology 5(4):491-495.

1991 Schonewald-Cox, C., M. Buechner, R. Sauvajot, and B. Wilcox. Resolving Conflicts between National Parks and surrounding lands: A review and discussion. Environmental Management 16(2):273-282.

1991 Schonewald-Cox, C. and M. Buechner. Housing viable populations in protected habitats: The value of a coarse-grained geographic analysis of density patterns and available habitat. pp. 213-225. *In* A. Seitz and V. Loeschcke (eds.), Species Conservation - An Approach to Population Biology. Birkhäuser Verlag, Basel, Switzerland, 281p.

1990 Little, R. and C. Schonewald-Cox. Fire management policy and boundary effects on parks: Lassen Volcanic National Park -- A case study. pp. 249-256. *In* C. van Riper III, T. J. Stohlgren, S. D. Veirs, Jr., and S. C. Hillyer (eds.), Proceedings of the Third Biennial Conference on California Parks. 268p.

1989 Schonewald-Cox, C. and T. J. Stohlgren. Biological diversity and global change: Habitat fragmentation and extinction. pp. 217-224. *In* R. D. Noble, J. L. Martin and K. F. Jensen (eds.) Proceedings U.S./U.S.S.R. Symposium: Air Pollution and Vegetation Change. U.S.D.A. Forest Service. Northeastern Forest Experiment Station, Broomall, PA, 311p.

1989 Schonewald-Cox, C. and T. J. Stohlgren. Wilderness and the protection of genetic diversity. pp. 83-91. *In Wilderness* Bench mark 1988: Proceedings of the National Wilderness Colloquium. January 13-14, 1988. Tampa, Florida. U.S.D.A. Forest Service, Southeastern Forest Experiment Station General Technical Report SE-51. Asheville, NC.

1988 Schonewald-Cox, C. Invited book review of Audubon Wildlife Report, 1987. Conservation Biology 2(4):406-407.

1988 Schonewald-Cox, C. Boundaries in the protection of nature reserves. BioScience 38(7):480-486.

1988 Schonewald-Cox, C. , R. J. Baker and J. W. Bayless. Applying the population/area model for planning of large mammal translocations. pp. 52-63. L. Nielsen and R. D. Brown (eds.) *In* Translocation of Wild Animals. Wisconsin Humane Society and Caesar Kleberg Wildlife Research Institute. WI. 333 pp.

1988 Salwasser, H., C. Schonewald-Cox, and R. Baker. A protocol for institutional coordination in wildlife conservation. pp. 159-174. *In* M. E. Soulé (ed.), Viable Populations. Cambridge Press, Cambridge, 189p.

1987 Schonewald-Cox, C. M. The Boundary Approach: A geographic analysis of design and conservation of nature reserves. Park Science 7(3):8-9.

1986 Schonewald-Cox, C. and J. W. Bayless. The Boundary Model: A geographic analysis of design and conservation of nature Reserves. Biological Conservation 38(4):305-322.

1986 Baker, R. and Schonewald-Cox. Management strategies for improving population viability. pp. 73-87. *In* B. A. Wilcox, P. F. Brussard, and B. G. Marcot (eds.), The Management of Viable Populations: Theory, Applications, and Case Studies. Unpub. Syllabus used by Center for Conservation Biology, Stanford University, Palo Alto, CA.

1986 Helm, R. C., and C. Schonewald-Cox. Yellow-bellied marmots and vehicle damage in Mineral King, Sequoia and Kings Canyon National Parks, California. CPSU/UC Technical Report No. 23. 52 pp.

1986 Schonewald-Cox, C. Founding populations in conservation: Problems and characteristics of small populations. pp. 1-16. *In* F. J. Brenner, S. K. Majumdar, and Ann Rhoads (eds.), Endangered and Threatened Species Programs in Pennsylvania and Other States: Causes, Issues, and Management. Pennsylvania Academy of Sciences, Philadelphia, PA.

1986 Schonewald-Cox, C. Diversity, germplasm, and natural resources. pp. 45-54. *In* K. C. Kim and L. Knutson (eds.), Foundation for a National Biological Survey. Allen Press.

1986 Schonewald-Cox, C., J. W. Bayless, and J. Schonewald. Cranial morphometry of Pacific coast elk (*Cervus elaphus*). Journal of Mammalogy 66(1):63-74.

1985 Schonewald-Cox, C. Genetics, minimum population size and the island reserve. pp. 432-458. *In* C. Stone and M. Scott (eds.), Hawaii's Terrestrial Ecosystems Preservation and Management. University of Hawaii Press, Honolulu.

1983 Schonewald-Cox, C., S. Chambers, B. MacBryde, and L. Thomas. Genetics and Conservation: A Reference for Managing Wild Animal and Plant Populations. Benjamin Cummings Publ. Co., Menlo Park, CA, 722 p.

1983 Schonewald-Cox, C. Guidelines to management: A beginning attempt. *pp. 414-445. In* Schonewald-Cox, C., S. Chambers, B. MacBryde, and L. Thomas. (eds.), Genetics and Conservation. Benjamin Cummings Publ. Co., Menlo Park, CA, 722 p.

1983 Schonewald-Cox, C. and J. W. Bayless. Questions posed by managers. Appendix III. *pp. 485-499. In* Schonewald-Cox, C., S. Chambers, B. MacBryde, and L. Thomas. (eds.), Genetics and Conservation. Benjamin Cummings Publ. Co., Menlo Park, CA, 722 p.

1982 Schonewald-Cox, C. Book review of The Desert Bighorn. J. Wildlife Management 46(2):565-566.

1982 Schonewald-Cox, C. Trends in research and applied technology: National Park Service, man and the biosphere and natural resources. Trends 19(4):6-9.

1982 Schonewald-Cox, C. Trends in resources management: Wildlife population management. *Trends* 19(1):21-27.

1979 Brownell, R.R., Schonewald, C., and R.R. Reeves. Preliminary Report on World Catches of Marine Mammals, 1966-1975. U. S. Marine Mammal Commission, Washington, DC, Department of Commerce, NTIS. PB-290-173, 363 p.

1977 Schonewald, C. Temporal patterns of courtship in a caviomorph rodent, the green acouchi, *(Myoprocta pratti).* Ph.D. Dissertation. Department of Zoology, University of Maryland.

1977 Schonewald, C. Quantitative determination of categories of behavior in courtship encounters using the acouchi, *Myoprocta pratti*. American Zoologist (Abstract).

Solicited Reports

1996 IUCN Category VI Protected Areas in North, Central and South America. Guidelines for Category VI. Technical Report for IUCN Parks Commission. Canada; and IUCN Background document for Category VI Protected Areas in North America. Technical Draft for IUCN Parks Commission. Canada. 11/96.

1987 Schonewald-Cox, C. The Role of the National Park Service in Protecting Biological Diversity. Results of the Director's [scientific] Task Force on the NPS Role in Protecting Biological Diversity, Sept. 1986, Report to the Director, 75 pp. (Project leader)

1981/1982 36 CFR 2.5 Congressional Record, rewrote section on “NPS natural history collections".

Contributor/Editorial participant

1990 Dittavio, F. D., P. Brussard, and J. McCrone. 1990. Protecting Biological Diversity in the National Parks: Workshop Recommendations. U.S. Department of the Interior, NPS. Transactions and Proceedings Series No. 9. 79p.

1989 Gall, Graham A. E., and Mary Staton (eds.). 1989. Integrating Conservation Biology and Agricultural Production. Public Service Research and Dissemination Program, University of California, Davis.

1982 U.S. Department of State. 1982. Proceedings of the U.S. Strategy Conference on Biological Diversity, Nov. 16-18, 1981. 126p.

1979 U.S. National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency Region 6, U.S. Department of the Interior, and the state of Texas. 1979. IXTOC-I Oil Spill Damage Assessment Program; Damage Assessment Technical Plan; a Cooperative Federal and State Program. November 16, 1979. 176p.

1979 Risser, Paul G. and Kathy D. Cornelison. Man and the Biosphere; U.S. Information Synthesis Project MAB-8 Biosphere Reserves. Oklahoma Biological Survey. Norman, Oklahoma. 109pp. (provided authors with consultation support on behalf of National Park Service, Man and the Biosphere Program).